

Figure 1.

Alignment of fungal lipolytic enzyme sequences

	1		50	
SEQ ID NO: 1	.....EVSQDLFNQF NLFAQYSAAA	YCG KNNDAPAGTN	33	
SEQ ID NO: 2	.....AV GVTITDFSNF KFYIQHGAAA	YC. .NSEAAAGSK	33	
SEQ ID NO: 3	SSSSTQDYRI ASEAEIKAHT FYTALSANA.	YCR TVIPG....		
SEQ ID NO: 4	.SSSSTQDYRI ASEAEIKAHT FYTALSANA.	YCR TVIPG....		
SEQ ID NO: 5	.SIDGGIRA ATSQEINELT YYTTLANS.	YCR TVIPG....		
SEQ ID NO: 6	.SASDGKKVV AATTAAQIQEF TKYAGIAATA	YCR SVVPG....		
SEQ ID NO: 7	....TAGQAL AASTQ.GISE DLYNRL.VEM ATISQAAYAD LCNIPST...			
SEQ ID NO: 8	....TAGHAL AASTQ.GISE DLYSRL.VEM ATISQAAYAD LCNIPST...			
SEQ ID NO: 9	.....TVTTQDLSNF RFYLQHADAA	YC. .NFNTAVGKP		
SEQ ID NO: 10	.....DIPTTQLEDF KFWVQYAAAT	YCP NNYVAKDGEK		
SEQ ID NO: 11	.....DVSTSELDQF EFWVQYAAAS	YYE ADYTAQVGDK		
SEQ ID NO: 12	.....SVSTSTLDEL OLFAQWSAAA	YCS NNID.SKDSN		
SEQ ID NO: 13	.....SVSTSTLDEL OLFSQWSAAA	YCS NNID.SDDSN		
SEQ ID NO: 14	.....DVSSSLNNL DLFAQYSAAA	YCD ENLN.STGTK		
	51		100	
SEQ ID NO: 1	ITCTGNACPE VEKADATFLY SFE.DSGVGD VTGFLALDNT NKLIVLSFRG		82	
SEQ ID NO: 2	ITCSNNNGCPT VQGNGATIVT SF..VGSKTG IGGYVATDSA RKEIVVSFRG		81	
SEQ ID NO: 3	GRWSCPBCGV AS..NLQITK TFST..LITD TNVLVAVGEK EKTIYVVFRG			
SEQ ID NO: 4	GQWSCPBCDV AP..NLNITK TFTT..LITD TNVLVAVGEN EKTIYVVFRG			
SEQ ID NO: 5	ATWDCIHCD A TE..DLKIIK TWST..LIYD TNAMVARGDS EKTIYIVFRG			
SEQ ID NO: 6	NKWDCVQCQK WVP.DGKIIT TFTS..LLSD TNGYVLRSDK QKTIYLVFRG			
SEQ ID NO: 7	.....IIK GEKIYNAQTD INGWILRDDT SKEIITVFRG			
SEQ ID NO: 8	.....IIK GEKIYNQTD INGWILRDDS SKEIITVFRG			
SEQ ID NO: 9	VHCSAGNCVD IEKDAAIIVVG SV..VGTKTG IGAYVATDNA RKEIVVSFRG			
SEQ ID NO: 10	LNCSVGNCVD VEAAGSTVKL SFS.DDTITD TAGFVAVDNT NKAIIVVAFRG			
SEQ ID NO: 11	LSCSKGNCPD VEATGATVSY DFS.DSTITD TAGYIAVDHT NSAVVLAFRG			
SEQ ID NO: 12	LTCTANACPS VEEASTTMML EFDLTNDFGG TAGFLAADNT NKRLVVAFRG			
SEQ ID NO: 13	VTCTADACPS VEEASTKMLL EFDLTNFGG TAGFLAADNT NKRLVVAFRG			
SEQ ID NO: 14	LTCVGNCPL VEAASTQSLD EFNESSSYGN PAGYLAADET NKLLVLSFRG			
	101		150	
SEQ ID NO: 1	SRSIENWIGN LNFDLKEIND I..CSGCRGH DGFTSSWRSP ADTLRQKVED		130	
SEQ ID NO: 2	SINIRNWLTN LDFG.QEDCS L..VSGCGVH SGFQRRAWNEI SSQATAAVAS		128	
SEQ ID NO: 3	TSSIRNAIAD IVFVNVYPP V...NGAKVH KGFLDSYNEV QDKLVAEVKA			
SEQ ID NO: 4	TSSIRNAIAD IVFVNVYPP V...NGAKVH KGFLDSYNEV QDKLVAEVKA			
SEQ ID NO: 5	SSSIRNWIAD LTFVNVSYPP V...SGTKVH KGFLDSYGEV QNELVATVLD			
SEQ ID NO: 6	TNSFRSAITD IVFNFSDYKP V...KGAKVH AGFLSSSYEQV VNDYFPVVQE			
SEQ ID NO: 7	TGSDTQLD TNYTLPFDL LPQCNCEVH GGYYIGWISV QDQVESLVKQ			
SEQ ID NO: 8	TGSDTQLD TNYTLPFDL LPQCNCEVH GGYYIGWISV QDQVESLVQQ			
SEQ ID NO: 9	SINVRNWITN FNFG.QKTCD L..VAGCGVH TGFLDAWEVV AANVKAAVSA			
SEQ ID NO: 10	SYSIRNWVTD ATFP.QTDPG L..CDGCKAE LGFWTAWKVV RDRIIKTLDE			
SEQ ID NO: 11	SYSVRNWVAD ATFP.HTNPG L..CDGCLAE LGFWSSWKLV RDDIikelke			
SEQ ID NO: 12	SSTIENWIAN LDFILEDNDD L..CTGCKVH TGFWKAWESA ADELTSKIKS			
SEQ ID NO: 13	SSTIKNWIAD LDFILQDNDD L..CTGCKVH TGFWKAWEEA ADNLTSKIKS			
SEQ ID NO: 14	SADLANWVAN LNFGLEDASD L..CSGCEVH SGFWKAWSEI ADTITSKVES			
	151		200	
SEQ ID NO: 1	AVREHPDYRV VFTGHSLGGA LATVAGADLR GNGY....D IDVFSYGAPR		175	
SEQ ID NO: 2	ARKANPSFNV ISTGHSLGGA VAVLAAANLR VGGT....P VDIYTYGSPR		173	
SEQ ID NO: 3	QLDRHPGYKI VVTGHSLGGA TAVLSALDLY HHGHA....N IEIYTQGQPR			
SEQ ID NO: 4	QLDRHPGYKI VVTGHSLGGA TAVLSALDLY HHGHD....N IEIYTQGQPR			
SEQ ID NO: 5	QFKQYPSYKV AVTGHSLGGA TALLCALDLY QREEGLSSSN LFLYTQGQPR			
SEQ ID NO: 6	QLTAHPTYKV IVTGHSLGGA QALLAGMDLY QREPRLSPKN LSIFTVGGPR			
SEQ ID NO: 7	QASQYPDYAL TVTGHSLGAS MAALTAAQL. SATYD....N VRLYTFGEPR			
SEQ ID NO: 8	QVSQFPDYAL TVTGHSLGAS LAALTAAQL. SATYD....N IRLYTFGEPR			
SEQ ID NO: 9	AKTANPTFKF VVTGHSLGGA VATIAAAYLK DGF....P FDLYTYGSPR			
SEQ ID NO: 10	LKPEHSDYKI VVVGHSLGAA IASLAAADLR TKNY....D AILYAYAAPR			

Fig. 1 cont.

SEQ ID NO: 11 VVAQNPNEYEL VVVGHSLGAA VATLAATDLR GKGYP....S AKLYAYASPR
 SEQ ID NO: 12 AMSTYSGYTL YFTGHSLGGA LATLGATVLR NDGY....S VELYTYGCPR
 SEQ ID NO: 13 AMSTYSGYTL YFTGHSLGGA LATLGATVLR NDGY....S VELYTYGCPR
 SEQ ID NO: 14 ALSDHSDYSL VLTGHSYGA LAALAATALR NSGH....S VELYNYGQPR

201

SEQ ID NO: 1	VGNRAFAEFL TVQ.....T GGTLYRITHT NDIVPRLPPR EFGYSHSSPE	250
SEQ ID NO: 2	VGNAQLSAFV SNQ..... AGGEYRVTHA DDPVPRLPPL IFGYRHTTP	219
SEQ ID NO: 3	IGTPAFANYV IGT..... KIPYQLVHE RDIVPHLPPG AFGFLHAGEEE	216
SEQ ID NO: 4	IGTPEFANYV IGT..... KIPYQLVNE RDIVPHLPPG AFGFLHAGEEE	
SEQ ID NO: 5	VGDPAFANYV VST..... GIPYRRTVNE RDIVPHLPPA AFGFLHAGEEE	
SEQ ID NO: 6	VGNPTFAYYV EST..... GIPFQRTVHK RDIVPHVPPQ SFGFLHPGV	
SEQ ID NO: 7	SGNQAFASYM NDAFQVSSPE TTQYFRVTHS NDGIPNLPPA DEGYAHGGVE	
SEQ ID NO: 8	S.NQAFASYM NDAFQASSPD TTQYFRVTHA NDGIPNLPPA DEGYAHGVVE	
SEQ ID NO: 9	VGNDFFANFV TQQ..... TGAEYRVTHG DDPVPRLPPI VFGYRHTSPE	
SEQ ID NO: 10	VANKPLAEFI TNQ..... GNNYRFTHN DDPVPKLPLL TMGYVHISPE	
SEQ ID NO: 11	VGNAALAKYI TAQ..... GNNYRFTHT NDPPVKLPLL SMGYVHVSPE	
SEQ ID NO: 12	IGNYALAEHI TSQ..... G SGANFRVTHL NDIVPRVPPM DFGFSQPSPE	
SEQ ID NO: 13	IGNYALAEHI TSQ..... G SGANFPVTHL NDIVPRVPPM DFGFSQPSPE	
SEQ ID NO: 14	LGNEALATYI TDQ..... N KGGNYRFVHT NDIVPKLPPT LLGYHHFSPE	

251

SEQ ID NO: 1	YWIKS..GTL VPVTRNDIVK IEGIDATG.G NNQPNIP... DIPAHLYWF.	300
SEQ ID NO: 2	FWLSGGGGDK VDYTISDVKV CEGAANLG.C NGGTLGL... DIAAHLHYF.	262
SEQ ID NO: 3	FWIMK..... DSSLRV CPNGIETDNC SNSIVPFT.. SVIDHLSYLD	261
SEQ ID NO: 4	FWIMK..... DSSLRV CPNGIETDNC SNSIVPFT.. SVIDHLSYLD	
SEQ ID NO: 5	YWITD..... NSPETVQV CTSDLETSDC SNSIVPFT.. SVLDHLSYFG	
SEQ ID NO: 6	SWIKS..... GTSNVQI CTSEIETKDC SNSIVPFT.. SILDHLSYFD	
SEQ ID NO: 7	YWSV....DP YSAQNTFVCT GDEVQCCE.A QGGQGVN... DAHTTYF.	
SEQ ID NO: 8	YWSV....DP YSAQNTFVCT GDEVQCCE.A QGGQGVN... NAHTTYF.	
SEQ ID NO: 9	YWLNG.GPLD KDYTUTEIKV CEGIANVM.C NGGTIGL... DILAHITYF.	
SEQ ID NO: 10	YYITA..PDN TTVTDNQVTW LDGYVNFK.G NTGTSGGLPD LLAFHSHVWY	
SEQ ID NO: 11	YWITS..PNN ATVSTSIDIW IDGDVSFD.G NTGTGLPLLT DFEAHIWYF.	
SEQ ID NO: 12	YWITS..GNG ASVTASDIEV IEGINSTA.G NAGEATV... SVLAHLWYF.	
SEQ ID NO: 13	YWITS..GTG ASVTASDIEL IEGINSTA.G NAGEATV... DVLAHLWYF.	
SEQ ID NO: 14	YYISS..ADE ATVTTTDVTE VTGIDATG.G NDGTDGT... SIDAHRWYF.	

301

SEQ ID NO: 1	GLIGT.CL..	350
SEQ ID NO: 2	QATDA.CNAG GFS.....	269
SEQ ID NO: 3	MNTGL.CL..	286
SEQ ID NO: 4	MNTGL.CL..	
SEQ ID NO: 5	INTGL.CT..	
SEQ ID NO: 6	INEGS.CL..	
SEQ ID NO: 7	GMTSGACTW.	
SEQ ID NO: 8	GMTSGHCTW	
SEQ ID NO: 9	QSMAT.CAPI AIPWKR...	
SEQ ID NO: 10	FIHADACKGP GLPLR...	
SEQ ID NO: 11	VQVDAGKGPG LPFKR...	
SEQ ID NO: 12	FAISE.CLL.	
SEQ ID NO: 13	FAISE.CLL.	
SEQ ID NO: 14	IYISE.CS..	

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<120> Lipolytic enzyme variants

<130> 10470-WO

<160> 14

<170> PatentIn version 3.2

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Asn Ile Thr Cys Thr Gly Asn Ala Cys Pro Glu Val Glu Lys Ala Asp
35 40 45

Ala Thr Phe Leu Tyr Ser Phe Glu Asp Ser Gly Val Gly Asp Val Thr
50 55 60

Gly Phe Leu Ala Leu Asp Asn Thr Asn Lys Leu Ile Val Leu Ser Phe
65 70 75 80

Arg Gly Ser Arg Ser Ile Glu Asn Trp Ile Gly Asn Leu Asn Phe Asp
85 90 95

Leu Lys Glu Ile Asn Asp Ile Cys Ser Gly Cys Arg Gly His Asp Gly
100 105 110

Phe Thr Ser Ser Trp Arg Ser Val Ala Asp Thr Leu Arg Gln Lys Val
115 120 125

Glu Asp Ala Val Arg Glu His Pro Asp Tyr Arg Val Val Phe Thr Gly
130 135 140

His Ser Leu Gly Gly Ala Leu Ala Thr Val Ala Gly Ala Asp Leu Arg
145 150 155 160

Gly Asn Gly Tyr Asp Ile Asp Val Phe Ser Tyr Gly Ala Pro Arg Val
165 170 175

Gly Asn Arg Ala Phe Ala Glu Phe Leu Thr Val Gln Thr Gly Gly Thr
180 185 190

Leu Tyr Arg Ile Thr His Thr Asn Asp Ile Val Pro Arg Leu Pro Pro
Page 1

195 200 205

Arg Glu Phe Gly Tyr Ser His Ser Ser Pro Glu Tyr Trp Ile Lys Ser
 210 215 220

Gly Thr Leu Val Pro Val Thr Arg Asn Asp Ile Val Lys Ile Glu Gly
 225 230 235 240

Ile Asp Ala Thr Gly Gly Asn Asn Gln Pro Asn Ile Pro Asp Ile Pro
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 260 265

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Lys Ile Thr Cys Ser Asn Asn Gly Cys Pro Thr Val Gln Gly Asn Gly
 35 40 45

Ala Thr Ile Val Thr Ser Phe Val Gly Ser Lys Thr Gly Ile Gly Gly
 50 55 60

Tyr Val Ala Thr Asp Ser Ala Arg Lys Glu Ile Val Val Ser Phe Arg
 65 70 75 80

Gly Ser Ile Asn Ile Arg Asn Trp Leu Thr Asn Leu Asp Phe Gly Gln
 85 90 95

Glu Asp Cys Ser Leu Val Ser Gly Cys Gly Val His Ser Gly Phe Gln
 100 105 110

Arg Ala Trp Asn Glu Ile Ser Ser Gln Ala Thr Ala Ala Val Ala Ser
 115 120 125

Ala Arg Lys Ala Asn Pro Ser Phe Asn Val Ile Ser Thr Gly His Ser
 130 135 140

Leu Gly Gly Ala Val Ala Val Leu Ala Ala Asn Leu Arg Val Gly
 145 150 155 160

Gly Thr Pro Val Asp Ile Tyr Thr Tyr Gly Ser Pro Arg Val Gly Asn
 165 170 175

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Ala Gln Leu Ser Ala Phe Val Ser Asn Gln Ala Gly Gly Glu Tyr Arg
180 185 190

Val Thr His Ala Asp Asp Pro Val Pro Arg Leu Pro Pro Leu Ile Phe
195 200 205

Gly Tyr Arg His Thr Thr Pro Glu Phe Trp Leu Ser Gly Gly Gly Gly
210 215 220

Asp Lys Val Asp Tyr Thr Ile Ser Asp Val Lys Val Cys Glu Gly Ala
225 230 235 240

Ala Asn Leu Gly Cys Asn Gly Gly Thr Leu Gly Leu Asp Ile Ala Ala
245 250 255

His Leu His Tyr Phe Gln Ala Thr Asp Ala Cys Asn Ala Gly Gly Phe
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275 280 285

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Thr Val Ile Pro Gly Gly Arg Trp Ser Cys Pro His Cys Gly Val Ala
35 40 45

Ser Asn Leu Gln Ile Thr Lys Thr Phe Ser Thr Leu Ile Thr Asp Thr
50 55 60

Asn Val Leu Val Ala Val Gly Glu Lys Glu Lys Thr Ile Tyr Val Val
65 70 75 80

Phe Arg Gly Thr Ser Ser Ile Arg Asn Ala Ile Ala Asp Ile Val Phe
85 90 95

Val Pro Val Asn Tyr Pro Pro Val Asn Gly Ala Lys Val His Lys Gly
100 105 110

Phe Leu Asp Ser Tyr Asn Glu Val Gln Asp Lys Leu Val Ala Glu Val
115 120 125

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Lys Ala Gln Leu Asp Arg His Pro Gly Tyr Lys Ile Val Val Thr Gly
 130 135 140

His Ser Leu Gly Gly Ala Thr Ala Val Leu Ser Ala Leu Asp Leu Tyr
 145 150 155 160

His His Gly His Ala Asn Ile Glu Ile Tyr Thr Gln Gly Gln Pro Arg
 165 170 175

Ile Gly Thr Pro Ala Phe Ala Asn Tyr Val Ile Gly Thr Lys Ile Pro
 180 185 190

Tyr Gln Arg Leu Val His Glu Arg Asp Ile Val Pro His Leu Pro Pro
 195 200 205

Gly Ala Phe Gly Phe Leu His Ala Gly Glu Glu Phe Trp Ile Met Lys
 210 215 220

Asp Ser Ser Leu Arg Val Cys Pro Asn Gly Ile Glu Thr Asp Asn Cys
 225 230 235 240

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 245 250 255

Leu Asp Met Asn Thr Gly Leu Cys Leu
 260 265

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 <213> Absidia corymbifera

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 20 25 30

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 35 40 45

Asn Leu Asn Ile Thr Lys Thr Phe Thr Thr Leu Ile Thr Asp Thr Asn
 50 55 60

Val Leu Val Ala Val Gly Glu Asn Glu Lys Thr Ile Tyr Val Val Phe
 65 70 75 80

Arg Gly Thr Ser Ser Ile Arg Asn Ala Ile Ala Asp Ile Val Phe Val
 85 90 95

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Pro Val Asn Tyr Pro Pro Val Asn Gly Ala Lys Val His Lys Gly Phe
 100 105 110

Leu Asp Ser Tyr Asn Glu Val Gln Asp Lys Leu Val Ala Glu Val Lys
 115 120 125

Ala Gln Leu Asp Arg His Pro Gly Tyr Lys Ile Val Val Thr Gly His
 130 135 140

Ser Leu Gly Gly Ala Thr Ala Val Leu Ser Ala Leu Asp Leu Tyr His
 145 150 155 160

His Gly His Asp Asn Ile Glu Ile Tyr Thr Gln Gly Gln Pro Arg Ile
 165 170 175

Gly Thr Pro Glu Phe Ala Asn Tyr Val Ile Gly Thr Lys Ile Pro Tyr
 180 185 190

Gln Arg Leu Val Asn Glu Arg Asp Ile Val Pro His Leu Pro Pro Gly
 195 200 205

Ala Phe Gly Phe Leu His Ala Gly Glu Glu Phe Trp Ile Met Lys Asp
 210 215 220

Ser Ser Leu Arg Val Cys Pro Asn Gly Ile Glu Thr Asp Asn Cys Ser
 225 230 235 240

Asn Ser Ile Val Pro Phe Thr Ser Val Ile Asp His Leu Ser Tyr Leu
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Asp Met Asn Thr Gly Leu Cys Leu
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 <213> Rhizomucor miehei

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 20 25 30

Ile Pro Gly Ala Thr Trp Asp Cys Ile His Cys Asp Ala Thr Glu Asp
 35 40 45

Leu Lys Ile Ile Lys Thr Trp Ser Thr Leu Ile Tyr Asp Thr Asn Ala
 50 55 60

Met Val Ala Arg Gly Asp Ser Glu Lys Thr Ile Tyr Ile Val Phe Arg
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<210> 6
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<213> Rhizopus oryzae

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Gln Glu Phe Thr Lys Tyr Ala Gly Ile Ala Ala Thr Ala Tyr Cys Arg
20 25 30

Ser Val Val Pro Gly Asn Lys Trp Asp Cys Val Gln Cys Gln Lys Trp
35 40 45

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Val Pro Asp Gly Lys Ile Ile Thr Thr Phe Thr Ser Leu Leu Ser Asp
 50 55 60

Thr Asn Gly Tyr Val Leu Arg Ser Asp Lys Gln Lys Thr Ile Tyr Leu
 65 70 75 80

Val Phe Arg Gly Thr Asn Ser Phe Arg Ser Ala Ile Thr Asp Ile Val
 85 90 95

Phe Asn Phe Ser Asp Tyr Lys Pro Val Lys Gly Ala Lys Val His Ala
 100 105 110

Gly Phe Leu Ser Ser Tyr Glu Gln Val Val Asn Asp Tyr Phe Pro Val
 115 120 125

Val Gln Glu Gln Leu Thr Ala His Pro Thr Tyr Lys Val Ile Val Thr
 130 135 140

Gly His Ser Leu Gly Gly Ala Gln Ala Leu Leu Ala Gly Met Asp Leu
 145 150 155 160

Tyr Gln Arg Glu Pro Arg Leu Ser Pro Lys Asn Leu Ser Ile Phe Thr
 165 170 175

Val Gly Gly Pro Arg Val Gly Asn Pro Thr Phe Ala Tyr Tyr Val Glu
 180 185 190

Ser Thr Gly Ile Pro Phe Gln Arg Thr Val His Lys Arg Asp Ile Val
 195 200 205

Pro His Val Pro Pro Gln Ser Phe Gly Phe Leu His Pro Gly Val Glu
 210 215 220

Ser Trp Ile Lys Ser Gly Thr Ser Asn Val Gln Ile Cys Thr Ser Glu
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Ile Glu Thr Lys Asp Cys Ser Asn Ser Ile Val Pro Phe Thr Ser Ile
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Leu Asp His Leu Ser Tyr Phe Asp Ile Asn Glu Gly Ser Cys Leu
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<213> Aspergillus niger

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 20 25 30

Ala Asp Leu Cys Asn Ile Pro Ser Thr Ile Ile Lys Gly Glu Lys Ile
 35 40 45

Tyr Asn Ala Gln Thr Asp Ile Asn Gly Trp Ile Leu Arg Asp Asp Thr
 50 55 60

Ser Lys Glu Ile Ile Thr Val Phe Arg Gly Thr Gly Ser Asp Thr Asn
 65 70 75 80

Leu Gln Leu Asp Thr Asn Tyr Thr Leu Thr Pro Phe Asp Thr Leu Pro
 85 90 95

Gln Cys Asn Asp Cys Glu Val His Gly Gly Tyr Tyr Ile Gly Trp Ile
 100 105 110

Ser Val Gln Asp Gln Val Glu Ser Leu Val Lys Gln Gln Ala Ser Gln
 115 120 125

Tyr Pro Asp Tyr Ala Leu Thr Val Thr Gly His Ser Leu Gly Ala Ser
 130 135 140

Met Ala Ala Leu Thr Ala Ala Gln Leu Ser Ala Thr Tyr Asp Asn Val
 145 150 155 160

Arg Leu Tyr Thr Phe Gly Glu Pro Arg Ser Gly Asn Gln Ala Phe Ala
 165 170 175

Ser Tyr Met Asn Asp Ala Phe Gln Val Ser Ser Pro Glu Thr Thr Gln
 180 185 190

Tyr Phe Arg Val Thr His Ser Asn Asp Gly Ile Pro Asn Leu Pro Pro
 195 200 205

Ala Asp Glu Gly Tyr Ala His Gly Gly Val Glu Tyr Trp Ser Val Asp
 210 215 220

Pro Tyr Ser Ala Gln Asn Thr Phe Val Cys Thr Gly Asp Glu Val Gln
 225 230 235 240

Cys Cys Glu Ala Gln Gly Gly Gln Gly Val Asn Asp Ala His Thr Thr
 245 250 255

Tyr Phe Gly Met Thr Ser Gly Ala Cys Thr Trp
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35 40 45Tyr Asn Ser Gln Thr Asp Ile Asn Gly Trp Ile Leu Arg Asp Asp Ser
50 55 60Ser Lys Glu Ile Ile Thr Val Phe Arg Gly Thr Gly Ser Asp Thr Asn
65 70 75 80Leu Gln Leu Asp Thr Asn Tyr Thr Leu Thr Pro Phe Asp Thr Leu Pro
85 90 95Gln Cys Asn Ser Cys Glu Val His Gly Gly Tyr Tyr Ile Gly Trp Ile
100 105 110Ser Val Gln Asp Gln Val Glu Ser Leu Val Gln Gln Val Ser Gln
115 120 125Phe Pro Asp Tyr Ala Leu Thr Val Thr Gly His Ser Leu Gly Ala Ser
130 135 140Leu Ala Ala Leu Thr Ala Ala Gln Leu Ser Ala Thr Tyr Asp Asn Ile
145 150 155 160Arg Leu Tyr Thr Phe Gly Glu Pro Arg Ser Asn Gln Ala Phe Ala Ser
165 170 175Tyr Met Asn Asp Ala Phe Gln Ala Ser Ser Pro Asp Thr Thr Gln Tyr
180 185 190Phe Arg Val Thr His Ala Asn Asp Gly Ile Pro Asn Leu Pro Pro Ala
195 200 205Asp Glu Gly Tyr Ala His Gly Val Val Glu Tyr Trp Ser Val Asp Pro
210 215 220Tyr Ser Ala Gln Asn Thr Phe Val Cys Thr Gly Asp Glu Val Gln Cys
225 230 235 240Cys Glu Ala Gln Gly Gly Gln Gly Val Asn Asn Ala His Thr Thr Tyr
245 250 255

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Phe Gly Met Thr Ser Gly His Cys Thr Trp
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 20 25 30

His Cys Ser Ala Gly Asn Cys Pro Asp Ile Glu Lys Asp Ala Ala Ile
 35 40 45

Val Val Gly Ser Val Val Gly Thr Lys Thr Gly Ile Gly Ala Tyr Val
 50 55 60

Ala Thr Asp Asn Ala Arg Lys Glu Ile Val Val Ser Val Arg Gly Ser
 65 70 75 80

Ile Asn Val Arg Asn Trp Ile Thr Asn Phe Asn Phe Gly Gln Lys Thr
 85 90 95

Cys Asp Leu Val Ala Gly Cys Gly Val His Thr Gly Phe Leu Asp Ala
 100 105 110

Trp Glu Glu Val Ala Ala Asn Val Lys Ala Ala Val Ser Ala Ala Lys
 115 120 125

Thr Ala Asn Pro Thr Phe Lys Phe Val Val Thr Gly His Ser Leu Gly
 130 135 140

Gly Ala Val Ala Thr Ile Ala Ala Ala Tyr Leu Arg Lys Asp Gly Phe
 145 150 155 160

Pro Phe Asp Leu Tyr Thr Tyr Gly Ser Pro Arg Val Gly Asn Asp Phe
 165 170 175

Phe Ala Asn Phe Val Thr Gln Gln Thr Gly Ala Glu Tyr Arg Val Thr
 180 185 190

His Gly Asp Asp Pro Val Pro Arg Leu Pro Pro Ile Val Phe Gly Tyr
 195 200 205

Arg His Thr Ser Pro Glu Tyr Trp Leu Asn Gly Gly Pro Leu Asp Lys
 210 215 220

Asp Tyr Thr Val Thr Glu Ile Lys Val Cys Glu Gly Ile Ala Asn Val
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225	230	10356-WO-ST25 235	240
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Met Cys Asn Gly Gly Thr Ile Gly Leu Asp Ile Leu Ala His Ile Thr
 245 250 255

Tyr Phe Gln Ser Met Ala Thr Cys Ala Pro Ile Ala Ile Pro Trp Lys
 260 265 270

Arg

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 <213> Aspergillus oryzae

<400> 10

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Ala Ala Ala Thr Tyr Cys Pro Asn Asn Tyr Val Ala Lys Asp Gly Glu
 20 25 30

Lys Leu Asn Cys Ser Val Gly Asn Cys Pro Asp Val Glu Ala Ala Gly
 35 40 45

Ser Thr Val Lys Leu Ser Phe Ser Asp Asp Thr Ile Thr Asp Thr Ala
 50 55 60

Gly Phe Val Ala Val Asp Asn Thr Asn Lys Ala Ile Val Val Ala Phe
 65 70 75 80

Arg Gly Ser Tyr Ser Ile Arg Asn Trp Val Thr Asp Ala Thr Phe Pro
 85 90 95

Gln Thr Asp Pro Gly Leu Cys Asp Gly Cys Lys Ala Glu Leu Gly Phe
 100 105 110

Trp Thr Ala Trp Lys Val Val Arg Asp Arg Ile Ile Lys Thr Leu Asp
 115 120 125

Glu Leu Lys Pro Glu His Ser Asp Tyr Lys Ile Val Val Val Gly His
 130 135 140

Ser Leu Gly Ala Ala Ile Ala Ser Leu Ala Ala Ala Asp Leu Arg Thr
 145 150 155 160

Lys Asn Tyr Asp Ala Ile Leu Tyr Ala Tyr Ala Ala Pro Arg Val Ala
 165 170 175

Asn Lys Pro Leu Ala Glu Phe Ile Thr Asn Gln Gly Asn Asn Tyr Arg
 180 185 190

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Phe Thr His Asn Asp Asp Pro Val Pro Lys Leu Pro Leu Leu Thr Met
 195 200 205

Gly Tyr Val His Ile Ser Pro Glu Tyr Tyr Ile Thr Ala Pro Asp Asn
 210 215 220

Thr Thr Val Thr Asp Asn Gln Val Thr Val Leu Asp Gly Tyr Val Asn
 225 230 235 240

Phe Lys Gly Asn Thr Gly Thr Ser Gly Gly Leu Pro Asp Leu Leu Ala
 245 250 255

Phe His Ser His Val Trp Tyr Phe Ile His Ala Asp Ala Cys Lys Gly
 260 265 270

Pro Gly Leu Pro Leu Arg
 275

<210> 11
 <211> 278
 <212> PRT
 <213> Penicillium camemberti

<400> 11

Asp Val Ser Thr Ser Glu Leu Asp Gln Phe Glu Phe Trp Val Gln Tyr
 1 5 10 15

Ala Ala Ala Ser Tyr Tyr Glu Ala Asp Tyr Thr Ala Gln Val Gly Asp
 20 25 30

Lys Leu Ser Cys Ser Lys Gly Asn Cys Pro Glu Val Glu Ala Thr Gly
 35 40 45

Ala Thr Val Ser Tyr Asp Phe Ser Asp Ser Thr Ile Thr Asp Thr Ala
 50 55 60

Gly Tyr Ile Ala Val Asp His Thr Asn Ser Ala Val Val Leu Ala Phe
 65 70 75 80

Arg Gly Ser Tyr Ser Val Arg Asn Trp Val Ala Asp Ala Thr Phe Val
 85 90 95

His Thr Asn Pro Gly Leu Cys Asp Gly Cys Leu Ala Glu Leu Gly Phe
 100 105 110

Trp Ser Ser Trp Lys Leu Val Arg Asp Asp Ile Ile Lys Glu Leu Lys
 115 120 125

Glu Val Val Ala Gln Asn Pro Asn Tyr Glu Leu Val Val Val Gly His
 130 135 140

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Ser Leu Gly Ala Ala Val Ala Thr Leu Ala Ala Thr Asp Leu Arg Gly
 145 150 155 160

Lys Gly Tyr Pro Ser Ala Lys Leu Tyr Ala Tyr Ala Ser Pro Arg Val
 165 170 175

Gly Asn Ala Ala Leu Ala Lys Tyr Ile Thr Ala Gln Gly Asn Asn Phe
 180 185 190

Arg Phe Thr His Thr Asn Asp Pro Val Pro Lys Leu Pro Leu Leu Ser
 195 200 205

Met Gly Tyr Val His Val Ser Pro Glu Tyr Trp Ile Thr Ser Pro Asn
 210 215 220

Asn Ala Thr Val Ser Thr Ser Asp Ile Lys Val Ile Asp Gly Asp Val
 225 230 235 240

Ser Phe Asp Gly Asn Thr Gly Thr Gly Leu Pro Leu Leu Thr Asp Phe
 245 250 255

Glu Ala His Ile Trp Tyr Phe Val Gln Val Asp Ala Gly Lys Gly Pro
 260 265 270

Gly Leu Pro Phe Lys Arg
 275

<210> 12

<211> 270

<212> PRT

<213> Aspergillus foetidus

<400> 12

Ser Val Ser Thr Ser Thr Leu Asp Glu Leu Gln Leu Phe Ala Gln Trp
 1 5 10 15

Ser Ala Ala Ala Tyr Cys Ser Asn Asn Ile Asp Ser Lys Asp Ser Asn
 20 25 30

Leu Thr Cys Thr Ala Asn Ala Cys Pro Ser Val Glu Glu Ala Ser Thr
 35 40 45

Thr Met Leu Leu Glu Phe Asp Leu Thr Asn Asp Phe Gly Gly Thr Ala
 50 55 60

Gly Phe Leu Ala Ala Asp Asn Thr Asn Lys Arg Leu Val Val Ala Phe
 65 70 75 80

Arg Gly Ser Ser Thr Ile Glu Asn Trp Ile Ala Asn Leu Asp Phe Ile
 85 90 95

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Leu Glu Asp Asn Asp Asp Leu Cys Thr Gly Cys Lys Val His Thr Gly
 100 105 110

Phe Trp Lys Ala Trp Glu Ser Ala Ala Asp Glu Leu Thr Ser Lys Ile
 115 120 125

Lys Ser Ala Met Ser Thr Tyr Ser Gly Tyr Thr Leu Tyr Phe Thr Gly
 130 135 140

His Ser Leu Gly Gly Ala Leu Ala Thr Leu Gly Ala Thr Val Leu Arg
 145 150 155 160

Asn Asp Gly Tyr Ser Val Glu Leu Tyr Thr Tyr Gly Cys Pro Arg Ile
 165 170 175

Gly Asn Tyr Ala Leu Ala Glu His Ile Thr Ser Gln Gly Ser Gly Ala
 180 185 190

Asn Phe Arg Val Thr His Leu Asn Asp Ile Val Pro Arg Val Pro Pro
 195 200 205

Met Asp Phe Gly Phe Ser Gln Pro Ser Pro Glu Tyr Trp Ile Thr Ser
 210 215 220

Gly Asn Gly Ala Ser Val Thr Ala Ser Asp Ile Glu Val Ile Glu Gly
 225 230 235 240

Ile Asn Ser Thr Ala Gly Asn Ala Gly Glu Ala Thr Val Ser Val Leu
 245 250 255

Ala His Leu Trp Tyr Phe Phe Ala Ile Ser Glu Cys Leu Leu
 260 265 270

<210> 13

<211> 270

<212> PRT

<213> *Aspergillus niger*

<400> 13

Ser Val Ser Thr Ser Thr Leu Asp Glu Leu Gln Leu Phe Ser Gln Trp
 1 5 10 15

Ser Ala Ala Ala Tyr Cys Ser Asn Asn Ile Asp Ser Asp Asp Ser Asn
 20 25 30

Val Thr Cys Thr Ala Asp Ala Cys Pro Ser Val Glu Glu Ala Ser Thr
 35 40 45

Lys Met Leu Leu Glu Phe Asp Leu Thr Asn Asn Phe Gly Gly Thr Ala
 50 55 60

Gly Phe Leu Ala Ala Asp Asn Thr Asn Lys Arg Leu Val Val Ala Phe
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65	70	10356-WO-ST25	75
			80

Arg Gly Ser Ser Thr Ile Lys Asn Trp Ile Ala Asp Leu Asp Phe Ile
 85 90 95

Leu Gln Asp Asn Asp Asp Leu Cys Thr Gly Cys Lys Val His Thr Gly
 100 105 110

Phe Trp Lys Ala Trp Glu Ala Ala Asp Asn Leu Thr Ser Lys Ile
 115 120 125

Lys Ser Ala Met Ser Thr Tyr Ser Gly Tyr Thr Leu Tyr Phe Thr Gly
 130 135 140

His Ser Leu Gly Gly Ala Leu Ala Thr Leu Gly Ala Thr Val Leu Arg
 145 150 155 160

Asn Asp Gly Tyr Ser Val Glu Leu Tyr Thr Tyr Gly Cys Pro Arg Val
 165 170 175

Gly Asn Tyr Ala Leu Ala Glu His Ile Thr Ser Gln Gly Ser Gly Ala
 180 185 190

Asn Phe Pro Val Thr His Leu Asn Asp Ile Val Pro Arg Val Pro Pro
 195 200 205

Met Asp Phe Gly Phe Ser Gln Pro Ser Pro Glu Tyr Trp Ile Thr Ser
 210 215 220

Gly Thr Gly Ala Ser Val Thr Ala Ser Asp Ile Glu Leu Ile Glu Gly
 225 230 235 240

Ile Asn Ser Thr Ala Gly Asn Ala Gly Glu Ala Thr Val Asp Val Leu
 245 250 255

Ala His Leu Trp Tyr Phe Phe Ala Ile Ser Glu Cys Leu Leu
 260 265 270

<210> 14

<211> 269

<212> PRT

<213> *Aspergillus oryzae*

<400> 14

Asp Val Ser Ser Ser Leu Leu Asn Asn Leu Asp Leu Phe Ala Gln Tyr
 1 5 10 15

Ser Ala Ala Ala Tyr Cys Asp Glu Asn Leu Asn Ser Thr Gly Thr Lys
 20 25 30

Leu Thr Cys Ser Val Gly Asn Cys Pro Leu Val Glu Ala Ala Ser Thr
 35 40 45

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Gln Ser Leu Asp Glu Phe Asn Glu Ser Ser Ser Tyr Gly Asn Pro Ala
50 55 60

Gly Tyr Leu Ala Ala Asp Glu Thr Asn Lys Leu Leu Val Leu Ser Phe
65 70 75 80

Arg Gly Ser Ala Asp Leu Ala Asn Trp Val Ala Asn Leu Asn Phe Gly
85 90 95

Leu Glu Asp Ala Ser Asp Leu Cys Ser Gly Cys Glu Val His Ser Gly
100 105 110

Phe Trp Lys Ala Trp Ser Glu Ile Ala Asp Thr Ile Thr Ser Lys Val
115 120 125

Glu Ser Ala Leu Ser Asp His Ser Asp Tyr Ser Leu Val Leu Thr Gly
130 135 140

His Ser Tyr Gly Ala Ala Leu Ala Ala Leu Ala Ala Thr Ala Leu Arg
145 150 155 160

Asn Ser Gly His Ser Val Glu Leu Tyr Asn Tyr Gly Gln Pro Arg Leu
165 170 175

Gly Asn Glu Ala Leu Ala Thr Tyr Ile Thr Asp Gln Asn Lys Gly Gly
180 185 190

Asn Tyr Arg Val Thr His Thr Asn Asp Ile Val Pro Lys Leu Pro Pro
195 200 205

Thr Leu Leu Gly Tyr His His Phe Ser Pro Glu Tyr Tyr Ile Ser Ser
210 215 220

Ala Asp Glu Ala Thr Val Thr Thr Asp Val Thr Glu Val Thr Gly
225 230 235 240

Ile Asp Ala Thr Gly Gly Asn Asp Gly Thr Asp Gly Thr Ser Ile Asp
245 250 255

Ala His Arg Trp Tyr Phe Ile Tyr Ile Ser Glu Cys Ser
260 265